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Safety Precautions

Precautions on Operation

- Please read the construction before operation.
- Do not collide in operation.
- After flickering, unplug the main socket when there is no run or chaos screen. Reinsert the plug then operate.
- Be careful when it is connected with the main cable and the diagnosis socket. Tighten the screw fastener and avoid disconnecting or destroying the interface.
- Handle with care. Avoid collision. Unplug the power after operation.
- Hold the connector when plugging or unplugging it. Do not pull the cable for unplugging.

Safety Precautions

- Automotive batteries contain sulfuric acid that is harmful to skin. In operation, direct contact with the automotive batteries should be avoided. Pay attention not to splash the sulfuric acid into eyes. Keep ignition sources away from the battery at all times.
- Engines produce various poisonous compounds (hydrocarbon, carbon monoxide, azote oxid, etc,) which should be avoided.
- Avoid contacting high temperature assembly such as water tank and vent-pipe as the temperature of the running engine is very high.
- Before starting engine, put the speed lever in the neutral position or in the P position to avoid injury.
- Wear an ANSI-approved eye shield when testing or repairing vehicles.
- If you are using the battery as a power source, connect the RED (+) battery clip to the positive of the vehicle battery and the BLACK (-) battery clip to the negative.

Precautions on Operating Vehicle ECU

- Do not disconnect the vehicle inner battery when connecting the ignition switch. When it is disconnected, transient voltage is very high, which may damage the sensor and ECU.
- Do not put the wireless reproducer near to the computer.
- Do cut off the power supply of the ECU system before jointing on the vehicle.
- Pay more attention to the ECU and sensor when operation is next to the ECU and sensor.
- Do not use the pointer ohm meter instead of digital instrument for testing ECU and sensor without special explanation.
- Do not test electric devices in relation with the ECU by a strobolamp unless otherwise expressly provided.
- People who get in and out the vehicle must wear an earthing metal strip with one end on the wrist and the other on the vehicle body.
- Pay attention to connect the ECU terminal.

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Introduction

X-431TOP automobile work station (short for X-431TOP) is a newly developed automobile diagnostic computer by LAUNCH. It succeeds to the fruits of many years' hard work and successful experience achieved by LAUNCH in the auto aftermarket field, which enhance the function of diagnosis with available more than 100 series. Besides its functions in reading trouble code and data stream, actuation test, read control module, adaptation, resetting maintain/ oil indicator and control unit code , X-431TOP also has the functions of vehicle oscilloscope, ignition analysis, vehicle sensor and vehicle information query, and these functions required several instruments once, now only one X-431TOP.

X-431TOP is designed with fission type: the main unit is separate from the terminal. The terminal is actually a test box, connecting to the correct port or component by cables (diagnostic cable, signal cable, etc.), which is used to collect signals or cache. The main unit, with large LCD multicolor touch screen, mainly deals, displays and controls the signals. X-431TOP main unit connects the terminal by bluetooth, so users can diagnose and check the vehicle by touching screen in anywhere.

Multilanguage display makes operation convenient in different countries and regions.

The function of software update via Internet makes it easy for customer to get the latest diagnostic program and keep pace with the development of automotive technology. As new auto series released continuously in the market, LAUNCH will in time develop the corresponding diagnostic software of new series, new systems and new functions, and will release the software on www.X431.com.

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Outline of X-431TOP

As shown in fig. 1-1 and fig1-2, X-431TOP is composed of two parts: the terminal and the main unit. Terminal is mainly used to collect signals. The main unit is used to operate X-431TOP terminal by instruction, and analyses and processes signals collected by X-431TOP terminal.

Fig1-1 X-431TOP terminal

Fig. 1-2 X-431TOP main unit

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Ports and Indicators

See Fig1-3 for X-431TOP connection ports and indicators.

Fig. 1-3

Note: table of ports and indicators.

1	CH1（channel 1&positive pole channel）	2	CH2（channel 2）
3	CH3（channel 3）	4	CH4（channel 4）
5	GND（GND channel）	6	Power switch
7	DC power jack	8	25PIN port
9	Power indicator	10	Diagnosis indicator
11	Communicate state indicator		

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Connectors and Diagnostic Cables

Fig 1-4 DAEWOO-12

Fig. 1-5 FIAT-3

Fig. 1-6 TOYOTA-16

Fig.1-7 TOYOTA-17

Fig.1-8 TOYOTA-17F

Fig.1-9 FORD-6+1

Fig. 1-10 CHRYSLER-6

Fig. 1-11 SUZUKI-3

Fig. 1-12 MAZDA-17

Fig. 1-13 ISUZU-3

Fig. 1-14 KIA-20

Fig. 1-15 OBD Ⅱ-16C

Fig. 1-16 AUDI-4

Fig. 1-17 BMW-16

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Fig. 1-18 BMW-20

Fig. 1-19 BENZ-38

Fig. 1-20 HONDA-3

Fig. 1-21 DAIHATSU-4

Fig.1-22 NISSAN-14+16

Fig.1-23MITSUBISHI/HYUNDAI-12+16

Fig.1-24 GM/VAZ-12

Fig.1-25 SMART-3

Fig.1-26 CITROEN-2

Fig.1-27 SMART OBD Ⅱ-16

Fig.1-28 TOYOTA-22

Fig.1-29 BENZ-14

Fig.1-30 SSANGYONG-14

Fig.1-31 SUBARU-9

Fig.1-32 CAN connector

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Fig.1-33 VOLVO CAN connector

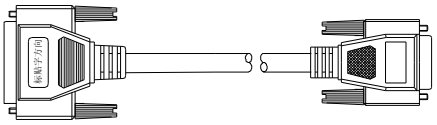

Fig.1-34 Diagnostic cable

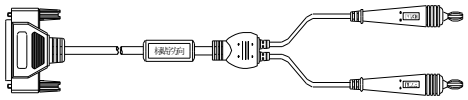

Fig.1-35 Sensor diagnostic cable

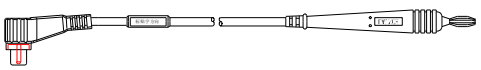

Fig.1-36 Oscilloscope cable

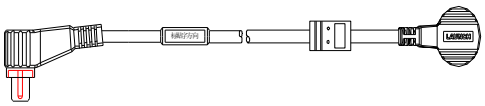

Fig.1-37 Secondary signal induction cable

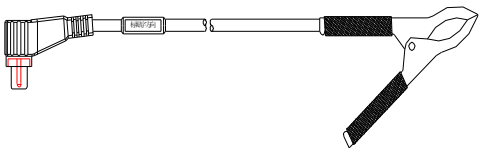

Fig.1-38 Oscillscope GND cable

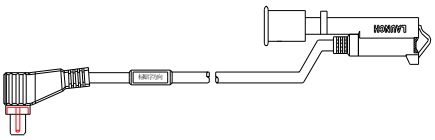

Fig.1-39Secondary signal cable

Fig.1-40 Electricity control patch cord 1

Fig.1-41 Electricity control patch cord 2

Fig.1-42 Electricity control patch cord 3

Fig.1-43Electricity control patch cord 4

Fig.1-44 Oscilloscope probe

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Fig.1-45 20MM crocodile clip（red）

Fig.1-46 Cigar ligter power supply

Fig.1-47 Primary signal patch cord

Note:
The hardware is different as the different con figuration for each modle.

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Hardware Configuration

NO.	NAME	QUA	DESCRIPTION	NOTE
1	X-431TOP MAIN UNIT	1		
2	X-431TOP TERMINAL	1		
3	[TOYOTA-17]DIAGNOSTIC CONNECTOR	1	Diagnose TOYOTA17PIN semicircle diagnostic socket model	See fig. 1-7
4	[TOYOTA-17F]DIAGNOSTIC CONNECTOR	1	Diagnose TOYOTA17PIN square diagnostic socket model	See fig. 1-8
5	[MITSUBISHI/HYUNDAI-12+16] DIAGNOSITC CONNECTOR	1	Diagnose MITSUBISH12PIN、16PIN and 12+16PIN diagnostic socket model	See fig. 1-23
6	[NISSAN-14+16]DIAGNOSTIC CONNECTOR	1	Diagnose NISSAN14PIN and 16PIN diagnostic socket model	See fig. 1-22
7	[HONDA-3]DIAGNOSTIC CONNECTOR	1	Diagnose HONDA3PIN diagnostic socket model	See fig. 1-20
8	[MAZDA-17]DIAGNOSTIC CONNECTOR	1	Diagnose MAZDA17PIN diagnostic socket model	See fig. 1-12
9	[KIA-20]DIAGNOSTIC CONNECTOR	1	Diagnose KIA20PIN diagnostic socket model	See fig. 1-14
10	[AUDI-4]DIAGNOSTIC CONNECTOR	1	Diagnose AUDI4PIN diagnostic socket model	See fig. 1-16
11	[BENZ-38]DIAGNOSTIC CONNECTOR	1	Diagnose BENZ38PIN diagnostic socket model	See fig. 1-19
12	[SMART-3]DIAGNOSTIC CONNECTOR	1	Read the flash code of the old model	See fig. 1-25
13	[BMW-20]DIAGNOSTIC CONNECTOR	1	Diagnose BMW20PIN diagnostic socket model	See fig. 1-18
14	[FIAT-3]DIAGNOSTIC CONNECTOR	1	Diagnose FIAT3PIN diagnostic socket model	See fig. 1-5
15	[GM/VAZ-12]DIAGNOSTIC CONNECTOR	1	Diagnose GM/VAZ12PIN diagnostic socket model	See fig. 1-24
16	[FORD-6+1]DIAGNOSTIC CONNECTOR	1	Diagnose FORD6+1PIN diagnostic socket model	See fig. 1-9
17	[SMARTOBDII-16]DIAGNOSTIC CONNECTOR	1	Diagnose OBDII16PIN diagnostic socket model	See fig. 1-27
18	[CHRYSLER-6]DIAGNOSTIC CONNECTOR	1	Diagnose CHRYSLER6PIN diagnostic socket model	See fig. 1-10

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19	[SUZUKI-3]DIAGNOSTIC CONNECTOR	1	Diagnose SUZUKI3PIN diagnostic socket model	See fig. 1-11
20	[ISUZU-3]DIAGNOSTIC CONNECTOR	1	Diagnose ISUZU3PIN diagnostic socket model	See fig. 1-13
21	[DAIHATSU -4]DIAGNOSTIC CONNECTOR	1	Diagnose DAIHATSU4PIN diagnostic socket model	See fig. 1-21
22	[CITROEN/FUKANG-2]DIAGNOSTIC CONNECTOR	1	Diagnose CITROEN/FUKANG 2PIN diagnostic socket model	See fig. 1-26
23	[MAZDA-17F]DIAGNOSTIC CONNECTOR	1	Diagnose HAIMA CA7130	See fig. 1-12
24	[BMW-16]DIAGNOSTIC CONNECTOR	1	Diagnose BMW16PIN diagnostic socket model	See fig. 1-17
25	[OBD II -16C]DIAGNOSTIC CONNECTOR	1	Diagnose all the systems except CAN BUS system of OBD II with CAN BUS	See fig. 1-27
26	[DAEWOO-12]DIAGNOSTIC CONNECTOR	1	Diagnose DAEWOO12PIN diagnostic socket model	See fig. 1-4
27	[TOYOTA-16]DIAGNOSTIC CONNECTOR	1	Diagnose TOYOTA16PIN diagnostic socket model	See fig. 1-6
28	[SUBARU-9]DIAGNOSTIC CONNECTOR	1	Diagnose SUBARU-9PIN diagnostic socket model	See fig. 1-31
29	[TOYOTA-22]DIAGNOSTIC CONNECTOR	1	Diagnose TOYOTA22PIN diagnostic socket model	See fig. 1-28
30	[COMBI-4]DIAGNOSTIC CONNECTOR	1	Diagnose COMBI4PIN diagnostic socket model	Not available
31	[SEDAN-3]DIAGNOSTIC CONNECTOR	1	Diagnose SEDAN3PIN diagnostic socket model	Not available
32	[BENZ-3]DIAGNOSTIC CONNECTOR	1	Diagnose BENZ3PIN diagnostic socket model	Not available
33	[BENZ-14]DIAGNOSTIC CONNECTOR	1	Diagnose BENZ14PIN diagnostic socket model	See fig. 1-29
34	[SSANG YONG-14]DIAGNOSTIC CONNECTOR	1	Diagnose SSANG YONG14PIN diagnostic socket model.	See fig. 1-30
35	[CAN]DIAGNOSTIC CONNECTOR	1	Diagnose CAN BUS system.	See fig. 1-32
36	[VOLVO CAN]DIAGNOSTIC CONNECTOR	1	Diagnose VOLVO vehicle with CANBUS.	See fig. 1-33

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37	KES secondary signal cable	1	Acquire secondary signal	See fig. 1-39
38	Secondary signal induction cable	1	Acquire variety of secondary signal of vehicle without high tension cable	See fig. 1-37
39	KES-200 — cylinder signal clamp	1	Acquire cylinder signal	Not available
40	20MM crocodile clip（red）	4		See fig. 1-45
41	Electricity control patch cord 1	5	Convenient to input signal for test.	See fig. 1-40
42	Electricity control patch cord 2	5	Convenient to input signal for test.	See fig. 1-41
43	Electricity control patch cord 3	5	Convenient to input signal for test.	See fig. 1-42
44	Electricity control patch cord 4	5	Convenient to input signal for test.	See fig. 1-43
45	Oscilloscope cable	4	Signal acquisition	See fig. 1-36
46	Oscilloscope probe	4	Signal acquisition	See fig. 1-44
47	Oscilloscope GND cable	1		See fig. 1-38
48	Sensor diagnostic cable	1	Diagnose sensor	See fig. 1-35
49	Diagnostic cable	1	Connect DIAGNOSTIC CONNECTOR to X-431TOP Terminal	See fig. 1-34
50	Cigar lighter power supply	1	Acquire power supply from vehicle cigar lighter	See fig. 1-46
51	Battery cable w/two clips	1	Acquire power supply from vehicle battery	Not available
52	Primary signal patch cord	4	Transfer signals when checking primary signal and electricity control sensor, which is convenient to input signals for test.	See fig. 1-47

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X-431TOP Operation

Starting

After the X-431TOP Terminal (power, diagnostic cable, etc. For more details, please refer to the explanations of connection below) is correctly connected, press the button to Power ON the X-431TOP Terminal (refer fig. 1-3), then press the power button to power ON the main unit (For more details about other operation of main unit, please refer to the accessory main unit manual). Several minutes later, the X-431TOP main unit automatically enters the main menu (fig.2-1).The X-431TOP main unit will automatically communicates with the X-431TOP Terminal by bluetooth.

Menu Descriptions

Fig 2-1

X-431TOP automobile diagnostic workstation provides 5 functions: vehicle diagnosis, vehicle osilloscope, ignition analysis, vehicle sensor and vehicle autobase..With help supplied by X-431TOP, it is easy to operate by pressing buttons.

Vehicle diagnosis: The following functions are applicable for all vehicles: read trouble code , clear trouble code, read datastream and actuation test function.It has other functions for different vehicle models.For details, please refer to the newly-developped vehicle diagnosis programm.

Vehicle oscilloscope:This function is uesd to test the vehicle circuit output waveform with a built-in storage capacity of 100 pages of waveforms.It has perfect display control and trigger mode.It can also test and display waveforms from 4 chunnels at one time.

Ignition analysis:Provide ignition waveform analysis including distributor system anglysis ,independent ignition system analysis and simultenous ignition system analysis.

Vehicle sensor: For testing the output DC, resistance， frequency signal of the sensor and simulating the output voltage signal, square wave signal, standard output wave form signal of sensor and arbitrary wave form signal drawn by users.

Vehicle autobase: Provide inquiry function for circuit diagram and sensor information for curent normal vehicle model.

Buttons Descriptions

Parameter setting. Use this button to alter the current parameter.

Save the current result.

Check the saved test records.

Use this button for help when you meet trouble.

Confirm and execute.

Return to the previous window.

Display the previous page. Use this button when displaying all the content with several pages.

Display the next page. Use this button to display all the content having several

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pages.

DELETE Delete the chosen content.

RESET Reset.

PRINT Print the current content.

Note: The button will be highlighted when choosed.When the button font is grey, the button is disabled.

Function Introduction

Vehicle Fault Diagnosis

Connection Description

Choose the correct port, then connect the vehicle socket to main cable and connect the main cable to the X-431TOP Terminal (See fig. 3-1).

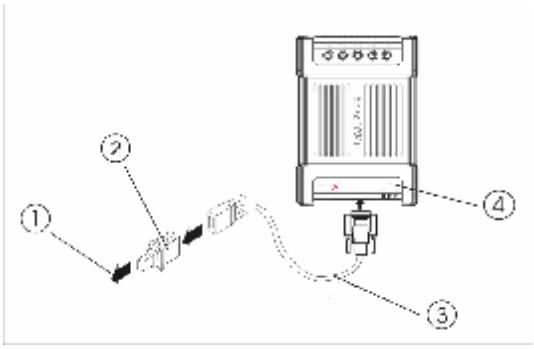

Fig.3-1 Connection illustration

1-to connect the vehicle diagnostic socket
2-diagnostic connector(choose the corresponding connector according to the vehicle model)
3-main cable
4-X-431TOP Terminal

Interface Operation

1. The main mask of the vehicle fault diagnosis is shown as in fig.3-1.Press [vehicle fault diagnosis] on the X-431TOP main mask as shown in fig.2- 1,then enter).
2. After conneting according to fig. 3-1,choose the tested vehicle then press [OK]and enter the corresponding vehicle [GAG]as shown in fig. 3-3
3. Choose the diagnosis version(after the upgrading of the diagnosis programm,the old and new version coexist so there are many versions can be selected),then press [download].After downloading(start to run it after loading it into memory),then enter the system choose mask as shown in fig3- 4

NOTE:
There will be some differences during the process of entering the system because of the different sort of the vehicle series, therefore the main operation is similar.Please according to the clue in operate.

4. After entering the system choose mask, the screen will display the diagnosis function choose mask as shown in fig. 3-5

NOTE:
Double click equals "choose→OK".

Fig. 3-2

(c) www.x431.lv, www.diagtools.lv

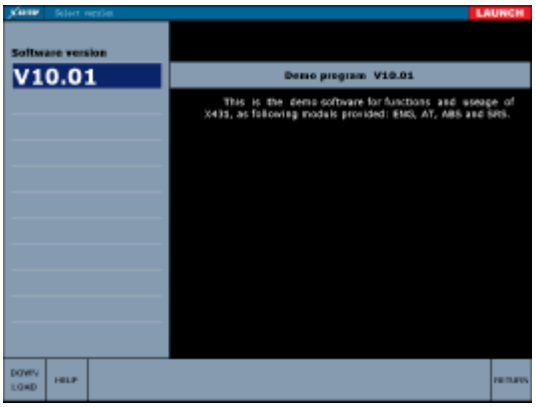
LAUNCH
Software version
V10.01
Demo program V10.01
This is the demo software for functions and useage of X431, as following models provided: EMS, AT, ABS and SRS.

Fig. 3-3

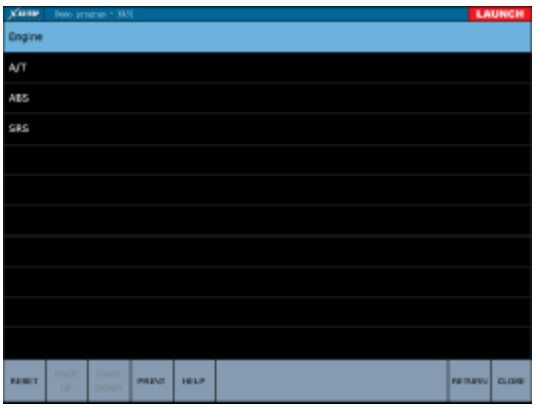

Fig. 3-4

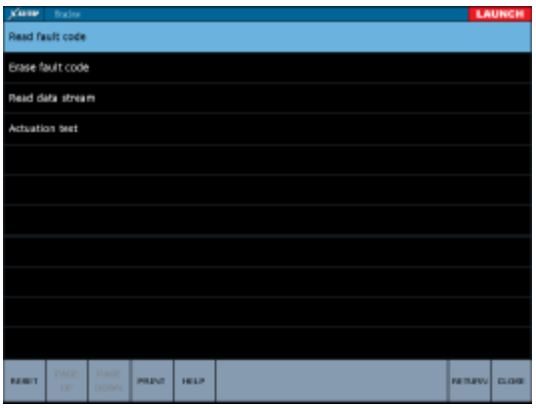

Fig. 3-5

Clicking the "history"button can view the diagnostic records saved before.(Fig. 3-6).

Fig. 3-6

Vehicle Oscilloscope

Vehicle oscilloscope does not only grasp the signals, but also can display the signals through waveforms with slow speed. Vehicle oscilloscope can record the signal waveform by storage and can replay the fast signal. In thus, it is very convenient to analyse the faults, including the fast signals (e.g. injector signal and intermittence fault signal) and slow signals (e.g. throttle position variation signal and oxygen sensor signal).

Connection Description

Connect one end of the battery cable w/two clips to the battery for electricity, and connect the other end to the X-431TOP terminal DC port (refer to the X-431TOP terminal button and port description). Connect the oscilloscope GND cable to the X-431TOP terminal GND channel. When the oscilloscope cable is not long enough to connect the signal port, the electronically controlled patch cord can be used to connect the oscilloscope cable, and then connect the signal port.

(c) www.x431.lv, www.diagtools.lv

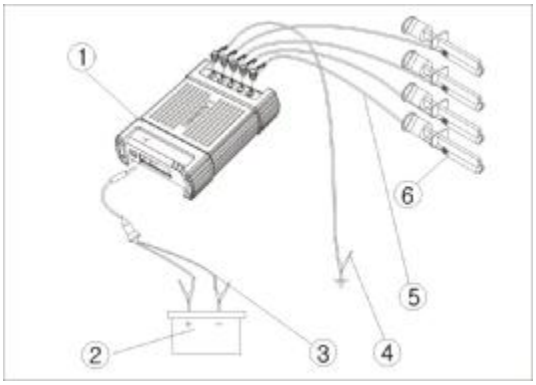

Fig. 3-7 Connection illustration for vehicle osciloscope

1-X-431TOP Terminal 2-battery
3-battery cable with w/two clips
4-oscilloscope GND cable
5-oscilloscope cable
6-electronically controlled patch cord

Attention: Please use the special capacitance probe when diagnosing the ignition high tension line. Do not directly connect the oscilloscope to the ignition secondary circuit.

NOTE:

1. *From cigar lighter: insert one end of the cigar lighter cable into the lighter socket in vehicle and connect the other end to the DC power connector of X-431TOP Terminal.*
2. *From double-clip power cable: connect one end of the double-clip power cable to the positive battery and the other end to the negative. (Make sure to connect correct ends.)*
3. *From power patch cord: connect one end of the power patch cord to the 100-240V AC socket and the other end to the jack of the on-off power. And connect the power jack to the DC power connector.*

Oscilloscope Menu

Fig.3-8 shows the entering vehicle oscilloscope menu. (Default "trigger" menu).
Parameter setting is in the left.
Trigger source: the trigger channel of oscilloscope[channel(CH1), channel(CH2), channel(CH3), channel(CH4)]. The chosen channel is light.
Trigger mode: (auto～ normal) and (single～ continuum). When in the auto mode, trigger as receive the signal. When in the normal mode, trigger as satisfied the trigger requirements (leading edge or trailing edge, trigger level, trigger point). When in the single mode, triggering once can display one waveform. When in the continuum mode, the variation of continuous waveform can be displayed.
Trigger edge: the leading edge or trailing edge of waveform. Clicking [leading] or [trailing] can switch mutually.
Trigger level: the original voltage value of waveform with regulation by [up] and [down].
Trigger point: to regulate the horizontal position of signal trigger with [leftward] and [rightward].

Note: When the numerical value and cursor don't occur, please choose the relevant channel display in the "display setting"menu.

Fig3-8

Other functions(refer to the previous explanation with history, save, print,help funcitons; gridding: turn on/off gridding). Fig.3-9 shows "other"interface.

(c) www.x431.lv, www.diagtools.lv

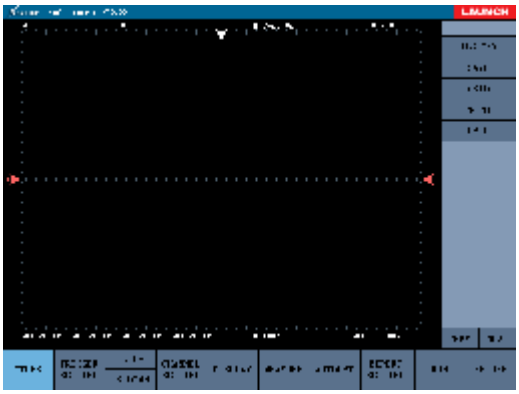

Fig. 3-9

TB U/ TB DOWN Regulate the time base value;

time base: the time value of the each case level length.

CHANNEL SETTING Channle parameter setting. Fig.3-10 shows the " channel " setting interface.

Channel: the current setting channel is lit.

Voltage: the voltage value of the each case vertical length with regulation by [add] and [decrease]. The display value in the right-down corner display the regulation value.

Ground:the 0V voltage position of oscilloscope display with regulation by [up]and [down].

Coupling mode: (AC ～ DC)and (positive ～ inverse). DC coupling: for measuring AC and DC signal; AC coupling: only let the AC portion transit .

Note: When the numerical value and cursor don't occur, please choose the relevant channel display on the "display setting".

Fig.3-10

DISPLAY Display mode setting with 7 display modes to be chosen. See fig. 3-11.

Fig. 3-11

MEASURE Measure voltage and time base. Click "measure" in fig 3-12 to enter.

The right column:Channel- choose the channel to measure and the current channel is lit.

Option- choose the option to measure .The time base and voltage can be measured(see fig. 3-13).

Corase tuning: to move 4 scales by a click.

Fine tuning: to move 1/5 scale by a click.

Fig.3-12

(c) www.x431.lv, www.diagtools.lv

Fig. 3-13

Fig. 3-14 shows the interface of measuring " voltage".

Fig. 3-14

AUTOSET System auto-setting parameter and display the signal waveform clearly.

Ignition Analysis

Generally speaking, diagnosis engine starts with ignition system. Nowadays ignition system includes distributor and distributorless. Distributorless includes independent ignition and simultaneous ignition. (See fig 3-15)

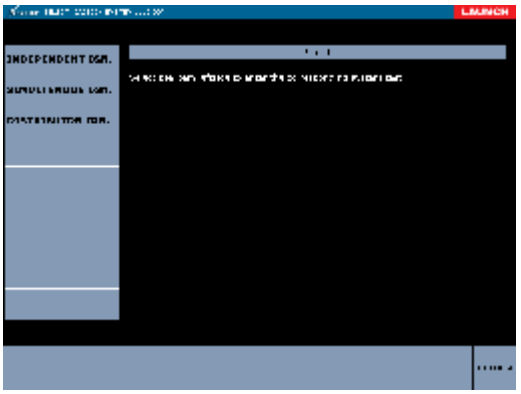

Fig 3-15

Distributor Ignition Analysis

Connection description:

1. Connect one end of the battery double-clip to the battery for electricity, and the other end to the X-431TOP terminal DC port (refers to the X-431TOP terminal button and port description).
2. Connect one end of the oscilloscope GND cable to the X-431TOP terminal GND channel and the other end to the ground.
3. Connect one end of one cylinder signal cable to the CH2 of the X-431TOP terminal and the other end to the high-tension cable.
4. Connect one end of the primary signal patch cord to the CH1 of the X-431TOP terminal and the other end to the primary positive of the ignition coil.

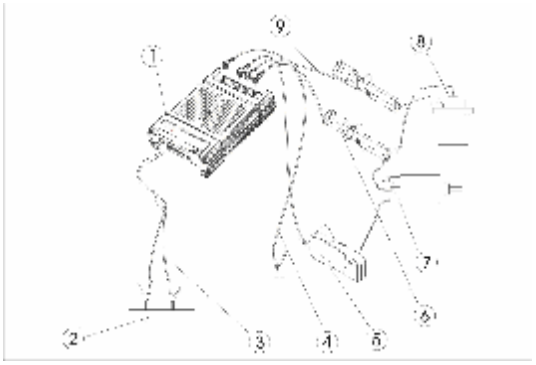

Fig. 3-16 Connection illustration for distributor ignition

1-X-431TOP terminal 2-battery

(c) www.x431.lv, www.diagtools.lv

3-battery cable w/two clips
4-oscilloscope GND cable（connecting GND）
5-cylinder signal clip（connecting CH3）
6-oscilloscope cable（connecting CH2）
7-distributor 8-ignition coil
9-primary signal patch cord（connecting CH1）

NOTE:

1. *From cigar lighter: insert one end of the cigar lighter cable into the lighter socket in vehicle and connect the other end to the DC power connector of X-431TOP Terminal.*
2. *From double-clip power cable: connect one end of the double-clip power cable to the positive & negative battery and the other end to the DC power connector of the X-431TOP Terminal. (Make sure to connect correct ends.)*
3. *From power patch cord: connect one end of the power patch cord to the 100-240V AC socket and the other end to the jack of the on-off power. And connect the power jack to the DC power connector.*

Fig 3-17 shows the distributor interface.

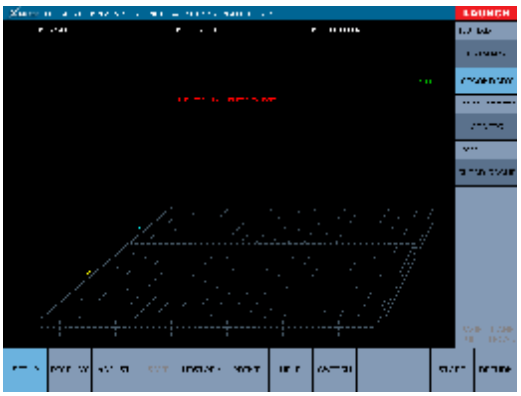

Fig 3-17 distributor interface

[Primary]: Primary signal test.
[Secondary]: Secondary signal test.
[Config]: Configure the cylinder quantity and ignition sequence of engine. Click"config" in fig 3-18 to enter the "config" interface.
[Clear cache]: clear the cache waveform data.

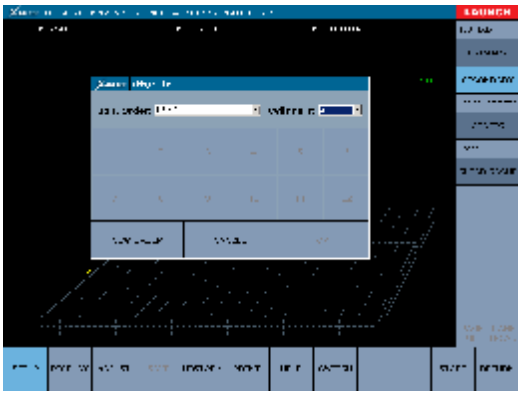

Fig. 3-18

On the pop-down menu of "cylinders", select the quantity of the cylinder, and then select the order sequence on the pop-down menu of " Ign. Order", or click the number to select the order. If you click wrong number , please click " new order" to change the order. Then click " start" , the system will execute the diagnosis.

Independent Ignition

Independent ignition analysis has two connection modes: one is with high-tension and the other is without high-tension

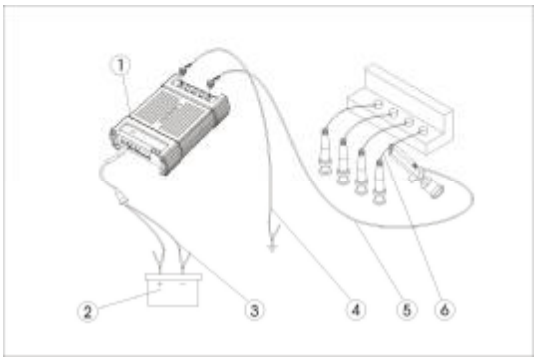

Fig. 3-19 Connection illustration for independent ignition with outer High-tension cable

1-X-431TOP terminal 2-battery
3-battery cable w/two clips
4-oscilloscope GND cable（connecting GND）
5-primary signal cable（connecting CH1）

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6-secondary high-tension cable

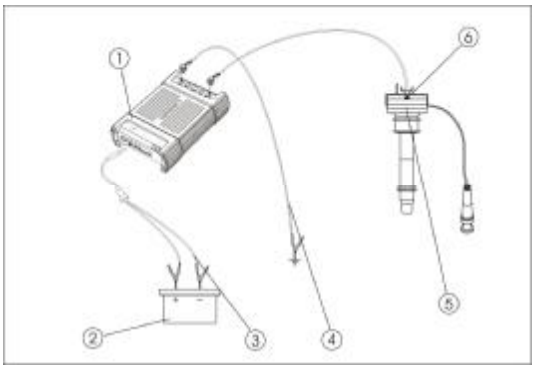

Fig. 3-20 Connection illustration for independent ignition with inner High-tension cable

1-X-431TOP terminal 2-battery
3-battery cable w/two clips
4-GND cable（connecting GND） 5-ignition coil
6-secondary signal induction cable （connecting CH1）

NOTE:

1. *From cigar lighter: insert one end of the cigar lighter cable into the lighter socket in vehicle and connect the other end to the DC power connector of X-431TOP Terminal.*
2. *From double-clip power cable: connect one end of the double-clip power cable to the positive battery and the other end to the negative. See fig...*
3. *From power patch cord: connect one end of the power patch cord to the 100-240V AC socket and the other end to the jack of the on-off power. And connect the power jack to the DC power connector.*

Fig. 3-21 shows the independent ignition interface.

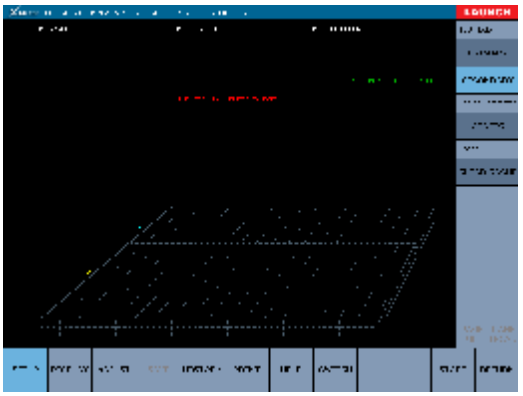

Fig.3-21 independent ignition

Simultaneous Ignition

The diagram of the Simultaneous Ignition analysis is as same as the independent ignition's. Refer to the independent ignition diagram.
Fig 3-22 shows the Simultaneous Ignition interface.

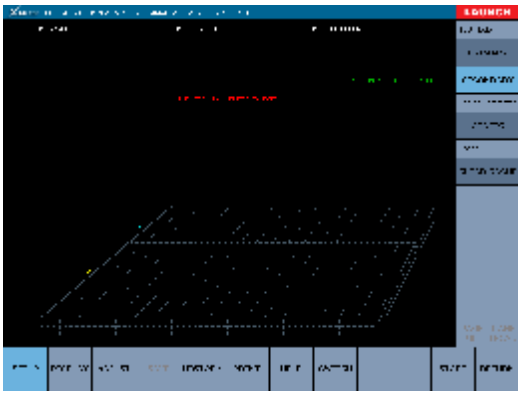

Fig 3-22 Simultaneous Ignition interface

X-431TOP provides 7 display modes: single-cylinder wave, parade pattern, raster pattern , bar graph, overlap pattern, ladder pattern and data table.These display modes are very convenient for uesrs to watch waveforms. Click [display] in the underside ,and then the buttons of 7 display modes will occur. The default waveform is ladder pattern. See fig 3-23.

(c) www.x431.lv, www.diagtools.lv

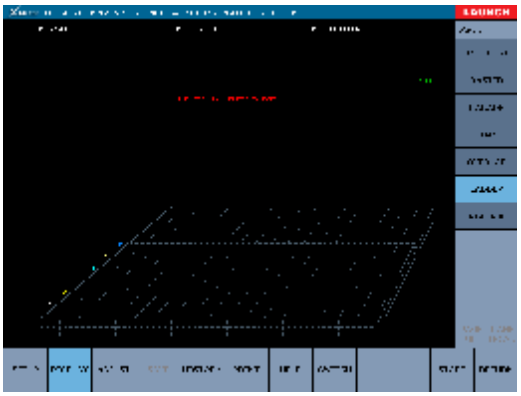

Fig 3-23

Fig.3-24 shows the "display" interface of independent ignition and simultaneous ignition.

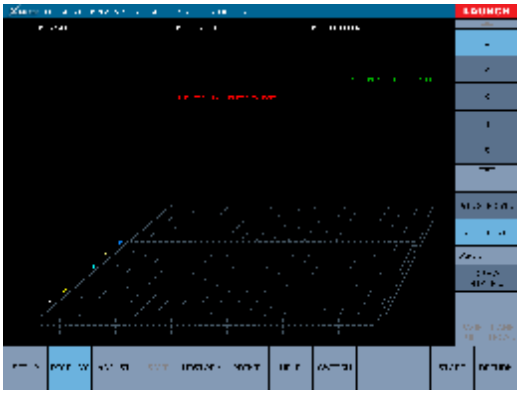

Fig 3-24

Ladder Pattern

Ladder pattern is the default display mode of system.

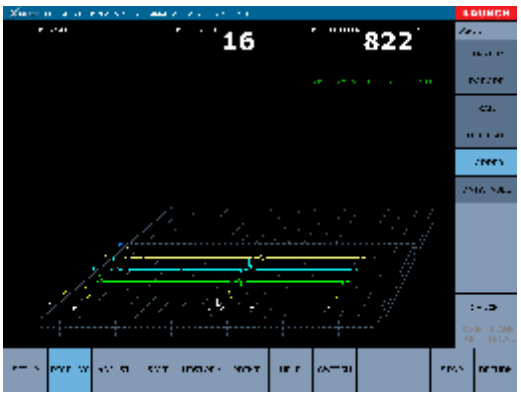

Fig 3-25

Single-cylinder Pattern

Fig 3-26 shows the single-cylinder pattern.

The ignition primary single-cylinder pattern test is mainly used to:

a. Analyze the ignition dwell angle of single cylinder.
b. Analyze the capability of ignition coil and primary high tension circuit.
c. Find the improper mixture A/F ratio of single cylinder.
d. Analyze the capability of capacitance.
e. Find the spark plug that causes the misfire of cylinder.

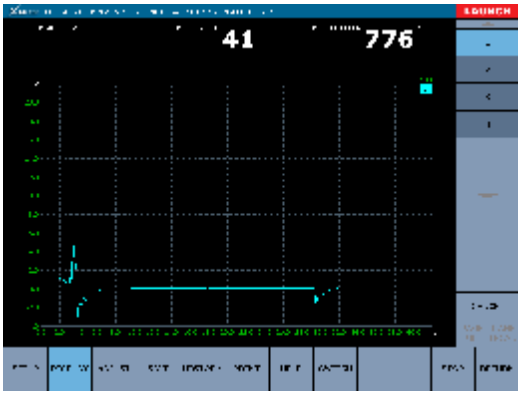

Fig 3-26

Raster Pattern

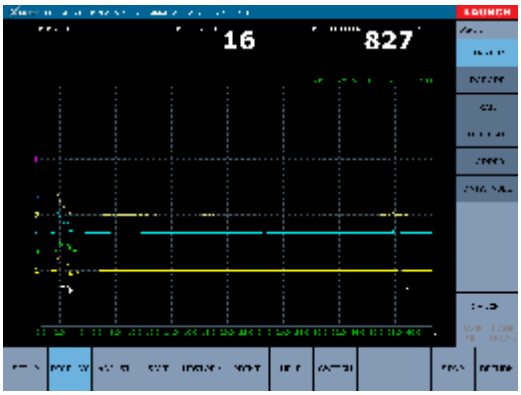

Fig. 3-27

(c) www.x431.lv, www.diagtools.lv

Fig 3-27 shows the raster pattern. With the raster pattern, it is very convenient to analyze the dwell angle and opening angle of each cylinder and the working state of each cylinder spark plug.

Parade Pattern

Fig 3-28 shows the parade pattern. This test can provide the valuable information about combustion quality state of each casing.

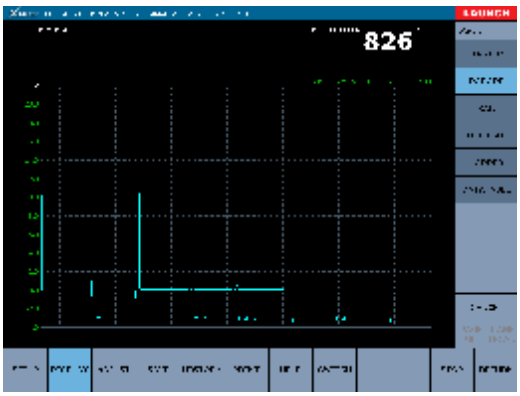

Fig. 3-28

Bar Graph

Fig 3-29 shows the bar graph.

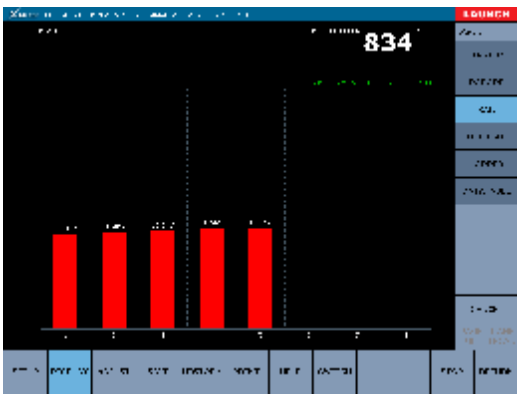

Fig. 3-29

Overlap Pattern

Fig 3-30 shows the overlap pattern.

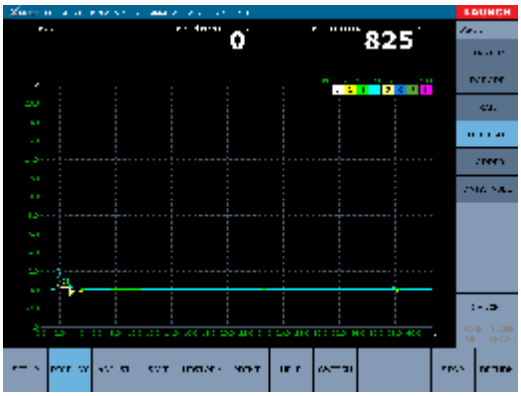

Fig. 3-30

Data Table

Fig 3-31 shows the data table. It displays the data of ignition breakdown voltage, spark voltage, spark time, dwell angle and overlapping angle in data table.

Fig. 3-31

Display Waveform Adjustment

Click "adjust" in "ignition analysis" mask (distributor, independent or simultaneous mask) to enter the "adjust" interface. (See fig 3-32).

(c) www.x431.lv, www.diagtools.lv

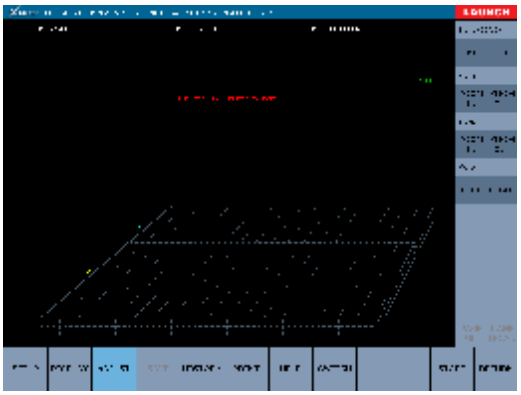

Fig. 3-32

[signal]: Click " INC" or "DEC" to increase or decrease the signal.

[X axial]: Click " IN" or "OUT" to zoom in or zoom out the proportion of X axial.

[Y axial]: Click " IN" or "OUT" to zoom in or zoom out the proportion of Y axial.

[MOVE]: Click " UP","DOWN","RIGHT" or "LEFT" to move the waveform.

Vehicle sensor

Fig. 3-33

The function of vehicle sensor includes vehicle multimeter and simulation function.

Connection Description

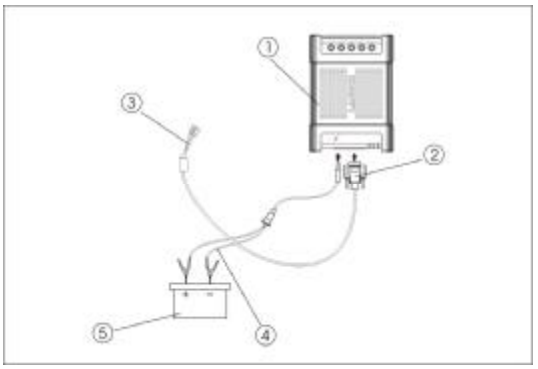

Fig. 3-34 Connection illustration for vehicle sensor

1-X-431TOP terminal
2-sensor test cable
3-test probe
4-battery cable w/two clips

- Connect the sensor test cable to the 26PIN port of the X-431TOP terminal.
- Connect the power supply to the DC port of the X-431TOP terminal.

NOTE:

1. *From cigar lighter: insert one end of the cigar lighter cable into the lighter socket in vehicle and connect the other end to the DC power connector of X-431TOP Terminal.*
2. *From double-clip power cable: connect one end of the double-clip power cable to the positive & negative battery and the other end to the DC power connector of the X-431TOP Terminal.(Make sure to connect correct ends).*
3. *From power patch cord: connect one end of the power patch cord to the 100-240V AC socket and the other end to the jack of the on-off power. And connect the power jack to the DC power connector.*

Vehicle Multimeter

In the interface as shown in fig. 3-35, voltage, resistance and frequency can be tested.

(c) www.x431.lv, www.diagtools.lv

Fig.3-35

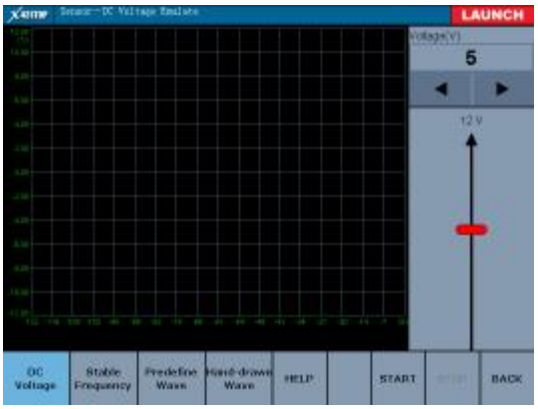

Fig. 3-36

Simulation Function

With simulation function users can exactly judge if the sensor is good or not, which can decrease replacing components blindly. For example, the trouble code displays the water temperature sensor fault. But there is need to make sure the fault is in the water temperature sensor or in the connection among the ECU or in the ECU on earth. So at this time, the signal of simulating water temperature sensor, instead of the water temperature sensor, import signal to the microcomputer by simulation function. If the engine work better and the fault symptom disappears, so the fault is in the water temperature sensor. If the fault symptom still occurs, import the signal by ECU port. So now, if the fault symptom disappears, the fault is in the connection between the water temperature sensor and the ECU; if the fault symptom still occurs, the fault is in the ECU.

The fig. 3-36 shows default interface of simulation function (DC interface). Sliding the red slide bar in the right or display voltage value button in the underside can adjust the magnitude of the simulation out-put DC current. After fixing the voltage value, click [start] in the underside, and then the X- 431 TOP starts to import simulation voltage.

Frequency Simulation

Frequency simulation can simulate square signal with pulse frequency 0.1~15kHz, range -12V~+12V, duty ratio 10%~90%.

Click "stable frequency"in fig.3-36 to enter the " stable frequency emulate" interface as shown in fig. 3-37.

[Frequency(Hz)]: to display the current square signal frequency with adjusting by the [decrease] and [add] in the underside.

[Duty ratio(%)]: to display the current duty ratio with adjusting by the [decrease] and [add] in the underside.

[High battery value (V)]: to display the current high battery value of square signal with adjusting by the [decrease] and [add] in the underside.

[Low battery value (V)]: to display the current low battery value of square signal with adjusting by the [decrease] and [add] in the underside.

(c) www.x431.lv, www.diagtools.lv

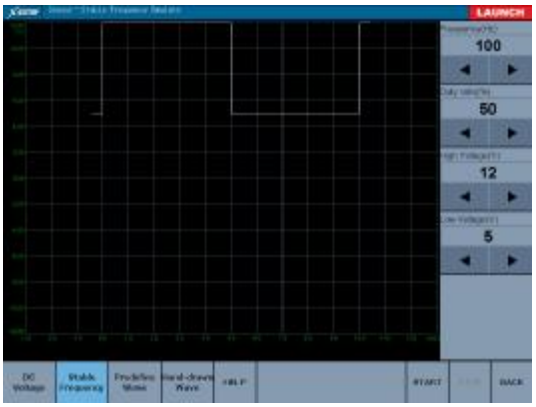

Fig. 3-37

Predefined Waveform

The X-431TOP provides predefined normal sensor waveform, which is very convenient to simulate the sensor signal for users. After exporting the predefined waveform (choose the simulation waveform to be displayed after [sensor type], [waveform type]), click [start], and then the relevant sensor waveform out-put can be simulated.

Fig. 3-38 shows the "predefined waveform" interface.

[Sensor type]: click the triangle symbol and choose the sensor type to be simulated on the drop-down menu. The X-431TOP provides the predefined waveform for ECT, EVP, HO2S, IAT, MAF, MAP, TP, VAF and VSS.

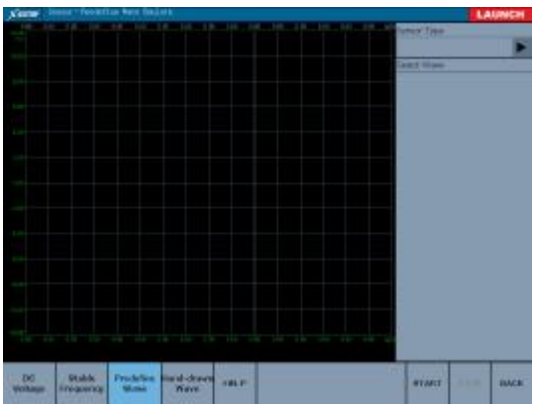

Fig. 3-38

Hand-draw Waveform

It is very convenient for users to simulate special waveform or fault wave with hand-draw waveform function. After drawing the waveform to be simulated in the left draw section and setting the crest voltage and bottom voltage of the waveform in the right parameter setting section, then click [start]. The X-431TOP can output the waveform.

Attention:
It is ok to draw a periodic integrated waveform (when it is outputted, the system will consider the waveform in the draw section as a periodic one). Users don't need to consider the crest &bottom battery and period in the draw section. Only need to set the crest & bottom battery and period in the right parameter setting section.

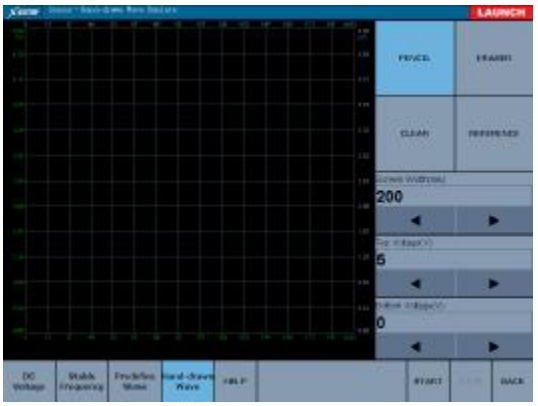

Fig. 3-39

Click the button, the mouse that moves to the draw section changes to be a pencil with which users can draw waveforms.

Click the button, the mouse that moves to the draw section changes to be circle which can be used as an eraser.

Clear the draw section.

Click the button, the predefined waveform will be outputted. Users can refer to the predefined waveforms.

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Precautions on Checking Vehicle Sensor

- Hold the connector when plugging or unplugging it. Do not pull the cable for unplugging.
- At first check the fuse, fusible line and connection port. Then check others after eliminating these faults.
- When measuring the voltage, the ignition switch should be turn on and the battery voltage should not be less than 11V.
- When measuring the voltage, please shake the lead lightly in the vertical and level direction for much veracity.
- When checking if there is a fault of the line open-circuit or not, at first disconnect the CEU and the relevant sensor, then measure the resistance among the ports of sensor in order to make sure there is open-circuit and contact fault or not.
- When checking if there is a short circuit fault or not, please disconnect the CEU and the relevant sensor, then measure the resistance value of the ports between the connected port and the vehicle body. When the resistance value is more than 1MΩ, there is no fault.
- Before disassembling the engine electrical control system cable, cut off the power supply, that is, the ignition switch is turned off.
- Pay attention to choose the correct GND ports of connectors.
- Contact the test probe and the two ports/ the two leads to be measured when measuring the voltage between the two ports or the two leads.
- Contact the test probe to the ports/ the cable to be measured, and the negative connector to the ground when measuring voltage of one port/ one cable.
- Checking the continuity of the ports, contact and lead is checking the ports, contact and lead electrify or not. The measure way for voltage value can be used here.
- Check the faults in the ports of the CEU to sensors, relays, etc.
- There are two test probes in the testing line. The black one is the signal public port(signal GND); the red one is the input port for voltage, resistance, frequency test and output port for simulation voltage, simulation frequency and λ oxygen sensor. Please choose the correct probes to match the different ports.

Vehicle autobase

This function provides the system circuit diagram of normal model. Click "Vehicle autobase" on the main menu (See fig. 2-1) to enter the fig. 3-40).

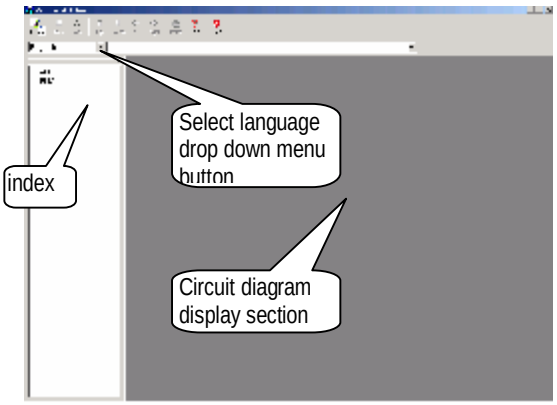

Fig.3-40

Click "+" on the left index to expand the index. Select the circuit diagram to view. The circuit diagram of the system will be displayed in the right section. (See fig. 3-41)

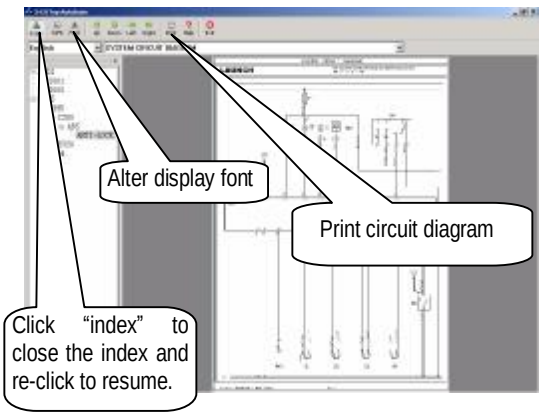

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Fig. 3-41

Move the mouse to one module (See fig. 3-42) or select one module on the drop-down menu (See Fig. 3-43), and then click to expand the circuit diagram. The red part is the selected module. (See fig. 3-44)

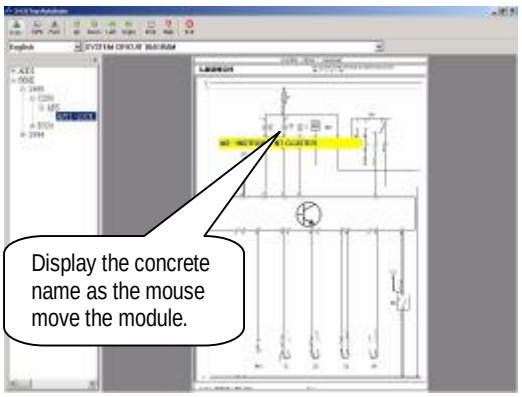

Fig. 3-42

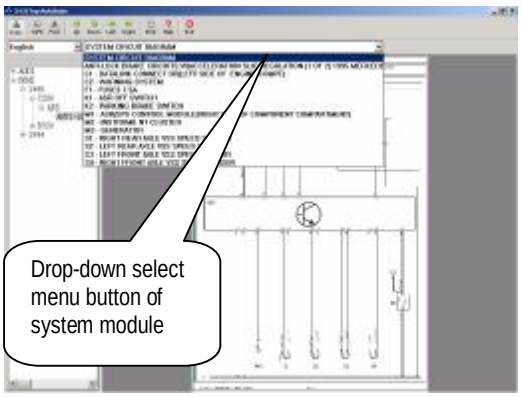

Fig.3-43

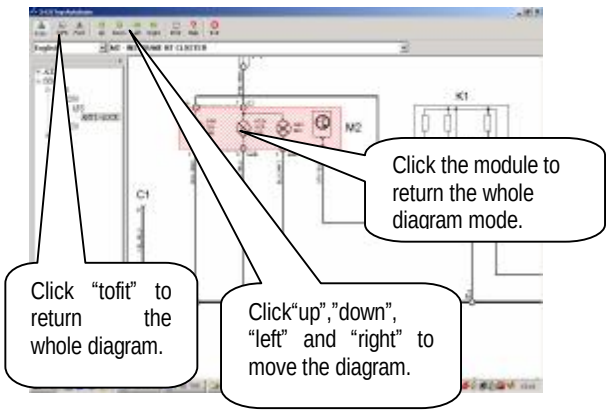
Click the module to return the whole diagram mode.
Click "tofit" to return the whole diagram.
Click"up","down", "left" and "right" to move the diagram.

Fig.3-44

Click " help" to acquire the help about the circuit diagram. (See fig. 3-45). Click "exit" to leave the interface.

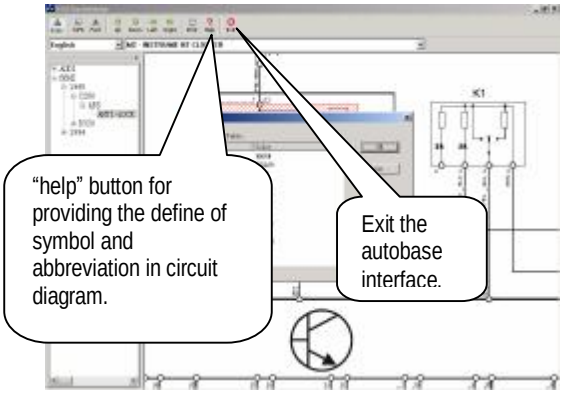

Fig. 3-45

Update of diagnostic Software

User Registration

Log on www.X431.com. Select the favorite language on the pull-down menu at the upper left of the interface to enter the homepage. See Fig.4-1.

Fig 4-1

Click "Register" in the interface as shown in

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fig. 4-1 to open the window as shown in fig 4-2.

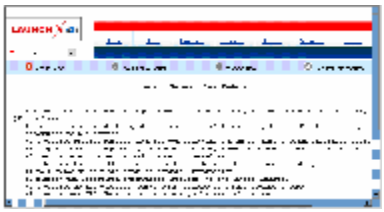

Fig 4-2

Note:
When the member purchases one or more products after registration, he should log onto the member area, and then click "product control" to register the newly purchased product. Refer to the section "Member login".

The terms of service is shown in the screen. After reading and fully understand it, click "I accept" button to enter the interface shown in Fig 4-3.

Fill in Product Information

Fill in the serial No. of X-431TOP terminal, registration No. and dealer code in the interface shown in Fig 4-3.

Fig 4-3

The serial No. is marked on the back of terminal. The registration No. is in an envelope delivered with the product (the number must be kept confidential). The dealer code is attached on the last page of the user's manual.

After the information is filled, click "Next step" to enter the next interface shown in Fig 4-4.

Note:

1. *When a product is sold, the dealer will log onto www. X431. com and enter the dealer code in the "Dealer administration" area so that the user can do effective registration later. User should contact the dealer if registration can not be done effectively.*
2. *If the filled serial No. or registration No. is invalid, the screen will display the message as shown in fig. below. Click "OK" button to return to the previous interface to re-fill the correct numbers.*

Fill User Information

Fig 4-4

After information is filled in the interface shown in Fig 4-4(The red textbox must be filled. After registration, we will send the confidential information to your registered e-mail, so please make sure that your e-mail is valid.), click "Next step", and then

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the screen will display the interface shown as fig 4-5. Click "OK' then the registration is completed.

Fig 4-5

Note:

Only the registered user can download and update the software.

Software Update

Member Login

The user becomes the registered member after registration. Member can log in the website by filling username, password and user type in the interface shown in Fig 4-1.

Note: when choosing the user type, the common users may choose the customer. If the dealer and the branch want to log in the website, please use the user information given by LAUNCH head office.

After log successfully, the screen will display the interface as shown in fig 4-6(The default interface is download center interface).

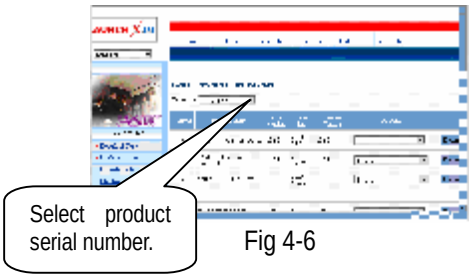

Fig 4-6

[Download Center]: Refer to "software download".

[Purchase Center]& [Update center]: Refer to "software purchase and update".

[Member Information]: Display and renew the current member information.

[Product Registration]: Register newly purchased product.

[Order Information]: Check or cancel the unpaid order.

[Renew Password]: After entering the right old password, then can renew the password.

[Awarded for complaint] If users meet some trouble during the operation, he can feedback to LAUNCH. Effective complaint will be awarded by LAUNCH

[Logout]: Users exit the registration.

Software Download

After log successfully, the screen will enter the [download center] interface. (See fig.4-8) Registered user can download the software that installed in the download center.

Before download, users had better set up a new folder named [X-431TOP update] on the computer desktop and put the download file to the[X-431TOP update] according the next steps.

Note:

1. *Software update of free charge will be provided by LAUNCH for one year. The free period is from the*

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registration date on the website, not the purchase date. That is, during one year after the registration, users can free download the corresponding software.

2. *If there is not the latest version in the download center, users can buy the version in the purchase center or in the update center. In the purchase center, users can buy the software that doesn't install in the download center. In the update center, users can buy the software that is beyond the free download period. After purchase successfully, the purchased software will be automatically added to the download center list.*

Update Tool Download

Before update, users must download the update tools. On the drop-down menu, users select the language then click [download]. The screen will display the interface as shown in fig 4-9.

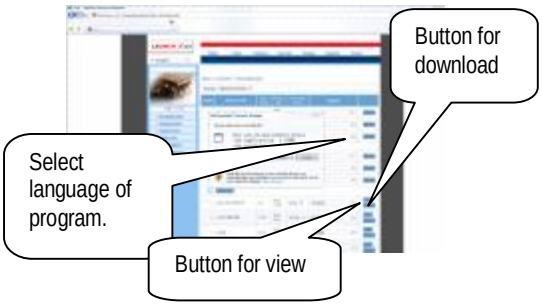

Fig 4-9

Click [save] to put it into the[X-431TOP update].

Display Program Download

When downloading the diagnostic program, users can also download the display program. On the drop-down menu, users select the language then click [down].Click [save] on the pop-up menu to put the program into the[X-431TOP update].

Diagnostic Program Download

On the drop-down menu, select the language and the version (The default version is the latest version). Click [down] icon, then click [save] on the pop-up menu to save the file.

Click [view] to learn the detailed information of the version.

Users can down the diagnostic program into the [X-431TOP update]. Up to now, the software that is for update is downloaded completely.

Fig 4-10

Software Update

Open the "X-431TOP update" folder, and double click the icon . Then install the update tool according to the prompts on the screen.

When the installation is complete, the "X-431TOP

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update tool" icon will appear on the desktop.

Double click the "X-431TOP update tool" icon to run the program. The program will automatically check the downloaded update files, including the diagnostic program and the display program. See Fig 4-11

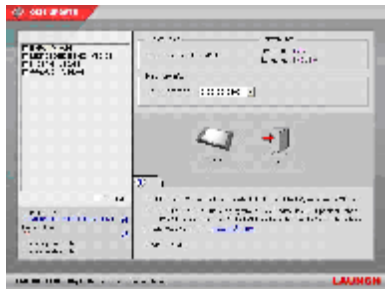

Fig 4-11

Select the module for update in the interface shown in Fig 4-11, and click "Update" icon to update. When the update is completed, prompts will appear to notify successful update.

Software Purchase and Update

If users can't find the software that he needed, at this time users should buy the software in the purchase center. Log on the www.X431.com then enter the interface as shown in fig 4-12.

Fig 4-12

Click [purchase center] to choose the serial number, and then tick in front of the serial number.

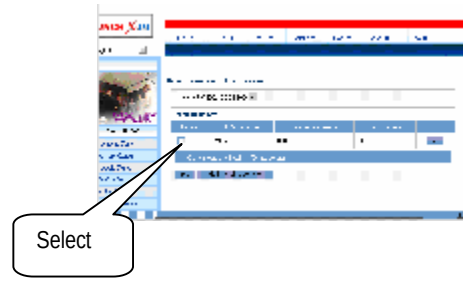

Fig 4-13

Take the Transporter& V Class as an example, click the [view] that is in the same line with the Transporter& V Class. The screen will display the concrete information about the Transporter&V Class diagnostic software.

A new page will appear when user clicks "Download" button. The pop up window will show the description for updating the downloaded software.

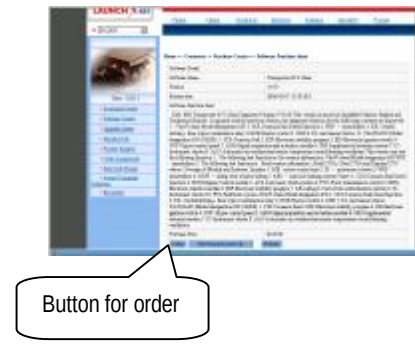

Fig 4-14

Click [order] to add the selected software to shopping chart. (See fig. 4-14).

Fig 4-15

Click [pay] to buy the software. The bought

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software will be automatically added to the user's download center.

Click [clear] to clear all the software in the shopping cart.

Click [purchase other] to buy other software. (See fig 4-15).

The operation for update center is the same as for the purchase center.

FAQ

X-431TOP is a hi-tech product. With the development of modern automotive industry, more and more new technology will be adopted and there may be questions during operation. Read the user's manual to get the answer whenever you have any question, or contact our Customer Service Center for help.

Here we list some frequently asked questions and answers relating to X-431 TOP.

About Update via Internet

Question: Some downloaded diagnostic program is not listed in the update tool, what is the reason?

Answer: There are two possible causes:
1. The downloaded diagnostic program is not put in the same folder as other diagnostic programs. Please move it to the same folder as others.
2. The diagnostic program is not fully downloaded. Please download the program again.

Question: Why can't some model data program be used after update?

Answer: The model data program is destroyed. Please download and update again.

About Operation

Question: System halts when reading data stream. What is the reason?

Answer: It may be caused by a slackened connector. Please turn off the machine, firmly connect the connector, and switch on the machine again.

Question: Why does the saved data disappear?

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Answer: You've changed language and the data is related to language. You may find the data after switching back to the former language.

Question: What can I do when the screen is confused?

Answer: Please quit the current application (interface), and run it again. If the problem still exists, please restart the system.

Question: Why can't I do operation in current interface?

Answer: There are two possible causes:
1. Your current interface has exited illegally. In this situation, you may not see the name of the application (interface) in the pop-up list when you click the active taskbar icon.
2. The system is busy, please wait patiently, or click the active taskbar icon to switch to another application.

Questions Related to Vehicle

Question: Why is operation interrupted during diagnosis?

Answer: It may be caused by electromagnetic interference or incorrect connection of connector.

Question: Why is there no response from vehicle ECU at communication?

Answer: Make sure that the voltage of vehicle battery, ignition timer and idle speed are in standard range; the throttle is in the closed position; and all electric devices, such as A/C, headlight, stereos etc, are turned off. Refer to the section "Conditions for Test".

Question: Some systems can not be diagnosed. Why?

Answer: The diagnostic socket for the system on some early vehicle may be separated. Refer to the vehicle instruction manual.

Question: No trouble code is found. Why?

Answer: It may be caused by the shared circuit. Find the nearest trouble code and circuit for analysis.

Question: Why are there too many trouble codes?

Answer: It may be caused by poor contact or poor grounding. Make sure that the vehicle model/year is selected correctly and the vehicle is equipped with the system

Maintenance

- storage
- Store the X-431 on a flat and dry place with suitable temperature.

- Never put the X-431 in direct sunlight or near the heating source.
- Prevent smoke, water and oil from entering the X-431.

- Avoid shock, dust, moisture and extremely high temperature.

- Do not disassemble the main unit. Clean the outside surface and screen with soft cloth that is dipped with a little water if the main unit is dirty. This should be done after the machine is turned off and the power cable is removed.

- Periodically turn on the X-431 main unit if it is not operated for long time to avoid moisture.

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X-431TOP Technical Parameter

Usage Parameter

Working ambient temperature：0℃～50℃
Transporting storage temperature：-10℃～70℃
Working ambient relevant humidity：20%～90%(40℃)
Transporting storage relevant humidity：20%～90%(40℃)
Pressure: 86kpa～106kpa

Oscilloscope Technical Parameter

Collection:
1.time resolution range: 2.5μs,5.0μs,10.0μs,25.0μs,50.0μs,100μs,250μs,500μs,1.0ms,2.5ms,5.0ms,10.0ms,25.0ms,50.0ms, 100ms,250ms,500ms,1.0s,2.5s,5.0s,10.0s.
2. signal mode: DC/ AC
Channels:
1.Coupling mode: DC,AC.
2.Measuring range: 5.0mv/div，10.0mv/div，20.0mv/div，50.0mv/div，100.0mv/div，200.0mv/div，500.0mv/div，1.0v/div，2.0v/div，5.0v/div，10.0v/div，20.0v/div.
Trigger:
1.Trigger channel: one of the CH1,CH2, CH3 and CH4.
2.Default trigger channel: CH1.
3.Default trigger level: 0mv.
4.Default level range: 6X(the measuring range of trigger channel).
Measuring :
1. Voltage Differential between cursor: (the measuring range of the channel)/ 50.
2. Time differential between cursor: (the time resolution range of any channels)/50.
Precision:
1. Time resolution: 2.5μs;
2. Voltage resolution: 5mv;
3. Time precision: ±5%.
4. Voltage precision: ±5%.

Ignition Analysis Parameter

1.Engine speed: measuring range 500-7200 r/min.
2. Real VCY_ICCANG (Platinum Dwell angle (%): measuring range 0-90°(cam bearer).
Precision:
1.Engine speed: indication error is less than 1%.
2.Real VCY_ICCANG (Platinum Dwell angle (%):indication error is less than ±1(cam bearer).

Sensor Test Technical Parameter

Sensor test function:
Voltage test:
1.Measuring range: DC -400V～+400 V
2.Input impedance: 10 MΩ.
Resistance test:
1.Measuring range: 0 MΩ～1 MΩ
2.Check precision: ±5 %
Frequency test:
1.Measuring range: 1 Hz～15 kHz
2..Input impedance: 300 kΩ
3.Input range: 1 V～12 V
4.Check precision: ±1 %

Sensor simulation function:
DC voltage signal:
1.Output range: -12 V～+12 V
2.The maximal output current: 40 mA
3.Output precision: ±5 %
Squarl-wave signal:
1. Impulse frequency: 0.1 Hz～15 kHz
2. Range: -12 V～+12 V
3. Duty ratio: 10%～90 %
4.Output precision: ±5 %
Sensor standard signal:
1. Frequency range: 0.1 Hz～100 Hz
2. Range: -12 V～+12 V
3.Output precision: ±5 %
Hand-draw waveform Signal:
1. Frequency range: 0.1 Hz～100 Hz
2. Range: -12 V～+12 V
3.Output precision: ±5 %

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Bluetooth Technical Parameter

Module:
1. Condition temperature: -20° C～+70° C；
2.The farthest transmission distance: 50 meters(open territory);
3.The propositional transmission distance: within 15 meters(open territory).

Safety Requirement

Evidence for export to USA:
FCC Part15 Section 15.107
Evidence for export to Europe:
IEC61000-4-2：2001
IEC61000-4-3：2002
IEC61000-4-4/A2：2001
IEC61000-4-5：2001
IEC61000-4-6：2001

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Warranty

THIS WARRANTY IS EXPRESSLY LIMITED TO PERSONS WHO PURCHASE LAUNCH PRODUCTS FOR PURPOSES OF RESALE OR USE IN THE ORDINARY COURSE OF THE BUYER'S BUSINESS.

LAUNCH electronic product is warranted against defects in materials and workmanship for one year (12 months) from date of delivery to the user.

This warranty does not cover any part that has been abused, altered, used for a purpose other than for which it was intended, or used in a manner inconsistent with instructions regarding use. The exclusive remedy for any automotive meter found to be defective is repair or replacement, and LAUNCH shall not be liable for any consequential or incidental damages.

Final determination of defects shall be made by LAUNCH in accordance with procedures established by LAUNCH. No agent, employee, or representative of LAUNCH has any authority to bind LAUNCH to any affirmation, representation, or warranty concerning LAUNCH automotive meters, except as stated herein.

Disclaimer

THE ABOVE WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Order Information

Replaceable and optional parts can be ordered directly from your LAUNCH authorized tool supplier. Your order should include the following information:

1. Quantity
2. Part number
3. Item description

Customer Service

If you have any questions on the operation of the unit, please contact us:

Tel: 86-755-82269474,
Fax: 86-755-82264570,
E-mail: overseasales @ cnlaunch. Com.

If your unit requires repair service, return it to the manufacturer with a copy of the sales receipt and a note describing the problem. If the unit is determined to be in warranty, it will be repaired or replaced at no charge. If the unit is determined to be out of warranty, it will be repaired for a nominal service charge plus return freight. Send the unit pre-paid to:

Attn: Overseas Department
LAUNCH TECH. CO., LTD.
Xinyang Building,
Bagua 4th Road,
Shenzhen, Guangdong Province,
China

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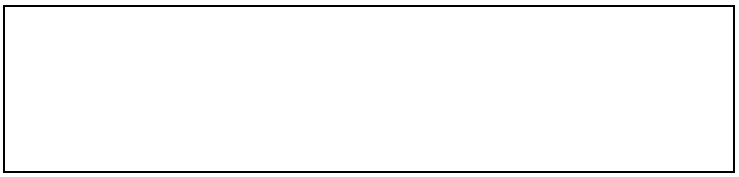
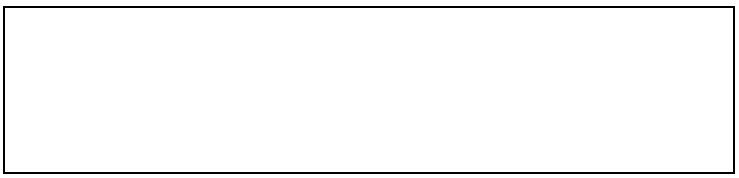
X-431TOP Terminal Serial Number



Dealer Code Number



Note:

1. Launch will label X-431TOP Terminal serial number when products are shipped.
2. The dealer must be requested to fill the dealer code number with broad seal when products are distributed.
3. The X-431TOP Terminal serial number and dealer code number are needed when products are updated on the website.Please refer to the "update of diagnostic software" chapter.
4. After the product is sold, the dealer should add the dealer code number information in the "dealer management" on the www.X431.com, otherwise, the users cannot register on the website for update.

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